

Health Systems for Post-Acute COVID-19 Syndrome [Long COVID-19] – Looking to The Future

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A B S T R A C T

Background/Aims: The World Health Organization documents 16 recommendations/measures for adoption by national health systems being a COVID-19 pandemic response stimulus package, various of which are applicable for long COVID-19.

Methods: A Pubmed literature review with search string; (((("SARS-CoV-2"[Mesh]) OR "COVID-19"[Mesh]) OR "Coronavirus"[Mesh]) AND "Health Systems Plans"[Mesh]) was performed, then a second search was performed; ("post-acute COVID-19 syndrome" [Supplementary Concept]) AND "Telemedicine"[Majr].

Results: The first search retrieved fourteen publications, encompassing topics such as health systems during various pandemic stages, the pandemic general response, how surgical emergencies were affected and travel recommencements, while one was foreign and no abstracts were available for four. The second search retrieved twelve manuscripts. The main issues specifically relating to future covid recovery included; assess and mitigate potential financial and physical barriers to accessing care, organise and expand services, train, re-purpose, and mobilise professionals, review supply chains and stocks of essential medicines and health technologies [including telehealth], organise and expand services, and ease logistical and operational barriers. The manuscript that focused on travel recommencement mentioned 3 components: (i) risk stratification (ii) travel specifics (iii) health insurance, and government policies at origin and destination countries. There was also a manuscript on the development of a 7-week interdisciplinary team virtual rehabilitation course for post-COVID-19 syndrome with patient ratings at completion showing significant improvement while another focused on covid-19 "long haulers" and neurological symptoms.

Conclusion: There was only a modest number of articles retrieved that focused on policy or literature pertaining specifically to long-COVID-19 ailment presentation and/or health system requirements.

Keywords: Coronavirus, COVID-19 syndrome, Health systems

Introduction/ Brief Overview of The Relevant Literature

A global pandemic was declared by the World Health Organization (WHO) on March 11, 2020 as a result of the novel coronavirus (COVID-19) outbreak (Cucinotta & Vanelli, 2020).

The WHO definition of Primary Health Care states that essential health care is based on practical, scientifically sound & socially acceptable methods & technology made universally

accessible, at a cost that communities & countries can afford to maintain [WHO]. There is a requirement for good governance, a legal framework, systematic & organizational structure, staff and personnel, leadership, solidarity and cohesion, structure, set up and social capital [social institution, social well-being & public trust]. Effective Health Systems require resources [& mechanisms to prepare, integrate & mobilize resources as such] finances, technology & IT, and efficient coordination with other sectors. Finally, activities related to maintaining or improving

health must exist. There must be equal access to prevention [including vaccines plus other measures], diagnosis & treatments throughout the life course. The broader determinants of health through multi-sectorial policy & action need to be addressed and actioned. Capacity Building also includes enabling empowerment, developing resiliency, decreasing or minimizing dependency and self-sufficiency. Of utmost importance is a sustained, deliberate and important focus on research and development.

The Declaration of the Alma-Ata in 1978 is pivotal for healthcare and is based on human rights. The COVID-19 questions global health assumptions and reaffirms the 1978 Alma Ata Declaration on primary health care, which has positioned health at the centre of projects that maintain economic change and human pride (Dentico, 2021).

More recently, there has been the recent Astana declaration which paves the way for primary health care (Jungo et al., 2020). It recognizes that remaining healthy is challenging for many people, particularly the poor, and inequities in health are unacceptable yet there is persistence in health disparities.

A comment in a Lancet publication titled; ‘Reasons for hope’ mentions a publication by Baum & Friel that was published in the Medical Journal of Australia (Horton, 2020). They state that to solve this COVID-19 syndemic challenge we need to go beyond a biomedical vision and include a social as well as a biological vaccine. This metaphor “a social vaccine” is not just focus on the biomedical orientation but there must be consideration of the underlying distal factors of which they list four; fair opportunities, security in life, biodiversity on a habitable planet and just governance.

This manuscript seeks to explore the literature pertaining to long covid in terms of the most common symptoms and ailment presentation, services available for treatment and rehabilitation with a focus also on telemedicine, and a lens that looks to the future.

Methods

The MeSH (Medical Subject Headings) browser is the NLM controlled vocabulary thesaurus used for indexing articles for PubMed. <https://www.ncbi.nlm.nih.gov/mesh>

The following search strings were created using Boolean operators using either ‘OR’ or ‘AND’.

((("COVID-19"[Mesh]) OR "Coronavirus"[Mesh]) OR "SARS-CoV-2"[Mesh]) AND "Health Systems Plans"[Mesh]

("Post-Acute COVID-19 Syndrome"[Mesh]) AND "Telemedicine"[Mesh]

Results

The first search performed in Feb 2023 retrieved 14 retrievals. The 2nd search again performed in the same month and year resulted in 12 retrievals. Various of the important findings from these manuscripts are summarised below.

Post-Covid-19 Syndrome and Follow-up Cohorts

Incidence of post-covid-19 syndrome has been reported on (Prabowo et al., 2022). This was via a retrospective analysis of 133 samples where 66.9% had mild symptoms. In this report the most common post covid-19 symptom was a cough. There was found to be a significant relationship between severity levels & critical headache & vertigo symptoms with a RR of 8.70

(95% CI, 1.10-68.69). Another manuscript more specifically assessed orthostatic intolerance & long-COVID syndrome in 14 patients (Eldokla et al., 2022). In 3 patients the head-up tilt table (HUTT) was significantly abnormal. This indicated postural orthostatic tachycardia syndrome (POTS). A further manuscript more specifically focused upon neurocognitive deficits in working-age patients with long-COVID (Holdsworth et al., 2022). This study included 205 patients, 24 w after acute illness with 69% reporting ≥ 3 ongoing symptoms. The most common symptoms included SOB (61%), fatigue (54%) & cognitive problems (47%). In addition, around one in five had mental health problems of either anxiety and/or depression. Persistent neurological symptoms in addition to cognitive dysfunction in non-hospitalized covid-19 ‘long haulers’ was also studied by Graham and colleagues (Graham et al., 2021). One hundred consecutive patients (50 SARS-CoV-2 laboratory-positive (SARS-CoV-2+) plus 50 laboratory-negative (SARS-CoV-2-) individuals were included. They reported that the most frequent coexisting medical complaints were depression/anxiety (42%) & autoimmune disease (16%). Neurologic conditions reported included: “brain fog” (81%), headache (68%), numbness/tingling (60%), dysgeusia (59%), anosmia (55%), & myalgias (55%). In addition, the majority of patients experienced fatigue, in fact 85% reported this.

Various other authors have found that long-lasting symptoms after covid were common with certain researchers assessing post-COVID-19 symptom burden in a large teaching hospital (Sykes et al., 2021). Patients studied included those with COVID-19 pneumonia and at follow up 86% of patients reported one residual symptom. The authors found more anxiety [0.001], fatigue [0.004] & myalgia [0.022] was reported in females. Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS) associated with long COVID was reviewed from patients at an aftercare clinic established in Okayama University Hospital including 279 patients (Tokumasu et al., 2022). Almost 90% of the patients experienced general fatigue & post-exertional malaise while other symptoms were also reported including headache (34.0%), insomnia (23.4%), dysosmia (21.3%) and dysgeusia (19.1%).

An observational cohort study from the Netherlands, reporting on the persistence of somatic symptoms after COVID-19 was published (Ballering et al., 2022). Included were 4231 (5.5%) participants who had COVID-19 who were matched to 8462 controls. Follow up time was reported for up to 90-150 days. Of people in the general population with COVID-19, 1/8 will have persistent symptoms [cardiorespiratory, musculoskeletal, general & sensory symptoms]. Rodriguez-Sanchez and colleagues also reported that along with respiratory and fatigue symptoms there are cognitive manifestations which can lead to frailty & disability (Rodriguez-Sanchez et al., 2022).

Holdsworth and colleagues found there was a high burden of symptoms, even 6-months after acute sickness and pre-COVID performance was not regained (Holdsworth et al., 2022).

Results from Meta-Analysis and Systematic Reviews

In addition to these individual studies at various hospitals, clinics or centres around the world, there have been a number of meta-analyses or systematic reviews done. These now will be described. A meta-analysis was performed to assess long-COVID in children and adolescents which included 21 studies [n= 80,071 children & adolescents] (Lopez-Leon et al., 2022). Long-COVID prevalence was 25.24% with individual reports of

mood symptoms (16.50%), fatigue (9.66%), & sleep disorders (8.42%).

Another meta-analysis that included 18 studies (n= 3699 patients) reviewed the prognosis and persistence of smell and taste dysfunction (Tan et al., 2022). Utilising parametric cure modelling this dysfunction was estimated in 5.6% (95% confidence interval 2.7% to 11.0%) adding to the burden of long covid.

A Systematic Review on rehabilitation interventions for post-acute COVID-19 syndrome included a search of MEDLINE, Embase, Cochrane Register of Controlled Trials, CINHAL, Scopus, Prospero, PEDro databases & the International Clinical Trials Registry Platform which resulted in x5 RCTs up to November 2021 [n=512] (Fugazzaro et al., 2022). Anxiety, shortness of breath and kinesiophobia were enhanced after rehabilitation. Various other respiratory parameters were variably affected, while there were some improvements in physical capacity and quality of life.

A further systematic review assessed the musculoskeletal manifestations of COVID-19 (Pires et al., 2022). The authors noted long COVID-19 resulted in musculoskeletal manifestations such as falls in the elderly, mortality after hip fracture, changes in bone mineral density and osteoporosis while many other conditions were also mentioned. These physical manifestations, can affect quality of life, requiring a multi-disciplinary team for prevention, diagnosis and treatment.

Telehealth for Long COVID-19 Treatment

There have been various emerging reports and authors who have discussed and published on the concerning issues of long COVID syndrome including reporting on the incredible uptake in telemedicine, that has both advantages and disadvantages (Poonja et al., 2022). They discussed how patients with Parkinson disease adapted to a virtual platform along with the care delivery architectural change. The ‘digital divide’ brought about by inequities was augmented.

Another author focused their attention on technology in relation to a specific symptom ailment, being fatigue as many patients who have post-acute Covid-19 must deal with fatigue (Ruckser-Scherb et al., 2022). The “Untire” App was reviewed in this manuscript and was described as easy to use generally. Most respondents found the features helpful including energy monitoring and relaxation guidance.

Telemonitoring in Long-COVID patients has also been reported on, where just three patients were included (Romaszko-Wojtowicz et al., 2022). The treatment included medical telemonitoring devices to monitor their pulmonological & cardiological health related to long COVID-19. While telemonitoring requires flexibility, the results showed that it was valuable, reliable working from a distance, and minimised patient stress.

A 7-week virtual rehabilitation course of the Primary Care Wellbeing Service [piloted in Oct 2020] recognized the long-term effects of COVID-19 (Harenwall et al., 2021). There were 149 people included who completed the “Recovering from COVID” & completed the EQ-5D-5L to assess health-related quality of life (HRQoL). This included 5 domains [mobility, self-care, usual activities, pain/discomfort, & anxiety/depression]. Completion of these measures was recorded for 76 individuals & there were significant improvements. (Harenwall et al., 2021).

Conclusion

When managing the long covid phenomenon it should be remembered that symptoms may not be directly attributable to the effect of SARS-CoV-2, but there may indeed be a biopsychosocial effect (Sykes et al., 2021).

Health system requirements for long COVID-19 treatment must include a multi-disciplinary comprehensive rehabilitation team. There must be an Interdisciplinary approach that involves a multicomponent & individualized program (exercise, diet, cognitive stimulation) for older people with persistent COVID (Rodriguez-Sanchez et al., 2022).

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